

REMARKS

I. Introduction

In response to the Office Action dated November 16, 2004, claims 37 and 39 have been canceled, and claim 1 has been amended. Claims 1-2, 4-9, 11-17, 35 and 38 remain in the application. Re-examination and re-consideration of the application, as amended, is requested.

II. Non-Art Rejections

In paragraphs (2)-(3) of the Office Action, claim 39 was rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement.

Applicants' attorney has canceled claim 39.

III. Prior Art Rejections

In paragraphs (4)-(5) of the Office Action, claims 1-2, 4-9, 15-17, 35, and 37-39 were rejected under 35 U.S.C. §102(e) as being anticipated by or, in the alternative, under 35 U.S.C. §103(a) as obvious over Goetz et al., U.S. Patent No. 6,441,393 (Goetz). In paragraph (7) of the Office Action, claims 1-2, 4-9, 11-17, 35, and 37-39 were rejected under 35 U.S.C. §103(a) as being unpatentable over Goetz in view of Redwing et al., U.S. Patent No. 5,874,747 (Redwing). In paragraph (8) of the Office Action, claims 1-2, 4-9, 11-17, 35, and 37-39 were rejected under 35 U.S.C. §103(a) as being unpatentable over Ishibashi et al., U.S. Patent No. 5,923,950 (Ishibashi) in view of Redwing or Edmond et al., U.S. Patent No. 5,739,554 (Edmond).

Applicants' attorney respectfully traverse these rejections.

As noted above, independent claim 1, and each dependent claim, were rejected as being anticipated by or, in the alternative, obvious in view of US 6,441,393 (Goetz). The Examiner has taken the position that the net compressive stress limitation of claim 37 (now incorporated into claim 1) would have been inherent in Goetz's structure because the differences in lattice constant throughout a graded layer inherently causes compressive stress. We note that a claim limitation must necessarily be present in the teachings of the prior art to support an inherency rejection (See MPEP §2112). The fact that a certain characteristic may be present in the prior art is not sufficient to establish the inherency of that result or characteristic.

We respectfully disagree with the assertion that the lattice constant differences in Goetz would necessarily lead to a compressive stress because other factors also contribute to the net

stress in a film. As noted in the background of the present application, the net stress also depends on a “thermal stress” component which arises from the thermal expansion mismatch when cooling from the growth temperature to room temperature (See paragraph 8). Relaxation effects associated with the lattice mismatch differences may also occur during growth which contribute to the net stress (See paragraph 8). Thus, the lattice constant difference, alone, would not necessarily lead to Goetz’s gallium nitride film having a net compressive stress. Moreover, Goetz fails to recognize the significance of generating a net compressive stress as it relates to crack suppression (or otherwise). In fact, Goetz even suggests that the films disclosed therein are under tensile strain (which can be reduced by using certain dopant combinations) (Column 5, lines 51-52). Accordingly, there is no reason to believe that the films disclosed in Goetz would necessarily have a net compressive stress as required to support an inherency rejection.

As noted above, independent claim 1, and each dependent claim, were rejected as being unpatentable over US 6,441,393 (Goetz) in view of US 5,874,747 (Redwing). The Examiner uses the same rationale in connection with claim 37 (now incorporated into claim 1) as in the rejection over Goetz - that the net compressive stress limitation would have been inherent in the combined structure because the differences in lattice constant throughout a graded layer inherently causes compressive stress. For the reasons noted above, we respectfully disagree. The lattice constant difference, alone, would not necessarily lead to a gallium nitride film having a net compressive stress. We further point out that Redwing also fails to recognize the significance of generating a net compressive stress as it relates to crack suppression. There is no reason to believe that the combination of Goetz and Redwing would produce a structure having a graded gallium nitride film that necessarily has a net compressive stress as required to support an inherency rejection.

As noted above, independent claim 1, and each dependent claim, were rejected as being unpatentable over US 5,923,950 (Ishibashi) in view of US 5,874,747 (Redwing) or US 5,739,554 (Edmond). The Examiner uses the same rationale in connection with claim 37 (now incorporated into claim 1) as in the two rejections discussed above - that the net compressive stress limitation would have been inherent in the combined structure because the differences in lattice constant throughout a graded layer inherently causes compressive stress. For reasons similar to those noted above, we respectfully disagree. The lattice constant difference, alone, would not necessarily lead to a gallium nitride film having a net compressive stress. We further point out that Ishibashi and Edmond also fail to recognize the significance of generating a net compressive

stress as it relates to crack suppression. Moreover, it is unclear what the effect of the silicon carbide converted silicon substrate disclosed in Ishibashi, and relied upon in the Office Action, would have on the resulting stress of the film. There is no reason to believe that the combinations of Ishibashi and Redwing or Ishibashi and Edmond would produce a structure having a graded gallium nitride film that necessarily has a net compressive stress as required to support an inherency rejection

Thus, Applicants' attorney submits that independent claim 1 are allowable over Goetz, Redwing, Ishibashi, and Edmond. Further, dependent claims 2, 4-9, 11-35, and 37-39 are submitted to be allowable over Goetz, Redwing, Ishibashi, and Edmond in the same manner, because they are dependent on independent claim 1, and thus contains all the limitations of the independent claims. In addition, dependent claims 2, 4-9, 11-35, and 37-39 recite additional novel elements not shown by Goetz, Redwing, Ishibashi, and Edmond.

IV. Conclusion

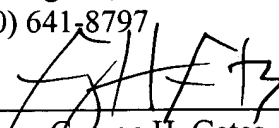
In view of the above, it is submitted that this application is now in good order for allowance and such allowance is respectfully solicited. Should the Examiner believe minor matters still remain that can be resolved in a telephone interview, the Examiner is urged to call Applicants' undersigned attorney.

Respectfully submitted,

GATES & COOPER LLP
Attorneys for Applicants

Howard Hughes Center
6701 Center Drive West, Suite 1050
Los Angeles, California 90045
(310) 641-8797

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By: 
Name: George H. Gates
Reg. No.: 33,500

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